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ABSTRACT

This report, one of a series of twenty-one studies discussing the developmental history of a recent educational product, discusses a beginning reading program for kindergarten that is planned as part of a broader communication skills program for the elementary grades. The first section of the report describes the product, which consists of student and teacher materials for ten units of classroom instruction. This section also discusses the characteristics of, rationale for, and procedures for using the product. The second section discusses the origins of the product in terms of key personnel, sources and evolution of ideas, and funding. Section three discusses the development of the product in relation to management and organization, the original plan and its modifications, procedures for development, and formative evaluation. The remainder of the report provides a summative evaluation of the product, and discusses its distribution, installation, future, and some of the critical decisions made during its development. Appendixes describe (1) rules for developing instructional products, (2) a trainer's guide, (3) names of consultants who reviewed the program, (4) the product development cycle, (5) product development stages, and (6) a list of the twenty-one educational products and their developers. (Author/DI)

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PRODUCT DEVELOPMENT REPORT:
FIRST YEAR COMMUNICATION SKILLS PROGRAM

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Palo Alto, California

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The research reported herein was performed pursuant to a contract with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

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Office of Education
Office of Program Planning and Evaluation

PREFACE

This product development report is one of 21 such reports, each dealing with the developmental history of a recent educational product. A list of the 21 products, and the agencies responsible for their development, is contained in Appendix F to this report. The study, of which this report is a component, was supported by U.S. Office of Education Contract No. OEC-0-70-4892, entitled "The Evaluation of the Impact of Educational Research and Development Products." The overall project was designed to examine the process of development of "successful educational products."

This report represents a relatively unique attempt to document what occurred in the development of a recent educational product that appears to have potential impact. The report is based upon published materials, documents in the files of the developing agency, and interviews with staff who were involved in the development of the product. A draft of each study was reviewed by the developer's staff. Generally, their suggestions for revisions were incorporated into the text; however, complete responsibility for interpretations concerning any facet of development, evaluation, and diffusion rests with the authors of this report.

Although awareness of the full impact of the study requires reading both the individual product development reports and the separate final report, each study may be read individually. For a quick overview of essential events in the product history, the reader is referred to those sections of the report containing the flow chart and the critical decision record.

The final report contains: a complete discussion of the procedures and the selection criteria used to identify exemplary educational products; generalizations drawn from the 21 product development case studies; a comparison of these generalizations with hypotheses currently existing in the literature regarding the processes of innovation and change; and the identification of some proposed data sources through which the U.S. Office of Education could monitor the impact of developing products. The final report also includes a detailed outline of the search procedures and the information sought for each case report.

Permanent project staff consisted of Calvin E. Wright, Principal Investigator; Jack J. Crawford, Project Director; Daniel W. Kratochvil, Research Scientist; and Carolyn A. Morrow, Administrative Assistant. In addition, other staff who assisted in the preparation of individual product reports are identified on the appropriate title pages. The Project Monitor was Dr. Alice Y. Scates of the USOE Office of Program Planning and Evaluation.

Sincere gratitude is extended to those overburdened staff members of the 21 product development studies who courteously and freely gave their time so that we might present a detailed and relatively accurate picture of the events in the development of some exemplary educational research and development products. If we have chronicled a just and moderately complete account of the birth of these products and the hard work that spawned them, credit lies with those staff members of each product development team who ransacked memory and files to recreate history.

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PRODUCT DESCRIPTION

Product Characteristics

Name

First Year Communication Skills Program.

Developer

Southwest Regional Laboratory for Educational Research and Development.

Distributor

Ginn and Company will assume responsibility for publishing and distributing the program for the 1972-73 school year. In 1971-72, SWRL is serving as its own distributor under a licensing arrangement with users.

Focus

The focus of the communication skills program is on the basic skills of English language communication, or beginning reading.

Grade Level

Kindergarten.

Target Population

The target population consists of kindergarten students who have not yet attained the goals of the communication skills program. The nature of these goals is such that they are not confined to any particular geographic, demographic, or racial-ethnic subpopulation. Although the geographic area served by SWRL includes most of southern California, portions of Arizona, and the entire State of Nevada, the intended eventual dissemination of the First Year Communication Skills Program will be nationwide.

Rationale for Product

Long Range Goals of Product

Ultimately, the First Year Communication Skills Program is planned to be part of a comprehensive package for the instruction of reading and English language communication skills for the elementary level. This will include a Second Year Communication Skills Program, and a Third Year Communication Skills Program, along with such items as a parent-assisted learning program, an instructional concepts program which is related to reading readiness, a

summer reading program, and a computer-based instructional management system. All are components of a comprehensive program produced by SWRL to develop the oral and written language skills of primary grade children.

Objectives of Product

The communication skills program for the first year has been designed to produce the following specific outcomes in kindergarten children who are exposed to it:

1. Read approximately 100 words.
2. Read 23 selected initial and ending word sounds.
3. Sound out and read any one-syllable word composed of word elements taught in the program.
4. Name each letter of the alphabet when shown the printed letter.

Philosophy and Theories Supporting Product

It is difficult to identify a single philosophy or a unique theory of learning behind the development of the communication skills program. It would be relevant to cite work done in the area of programmed instruction, stressing the use of student objectives stated in performance terms, measurement techniques developed from objectives, and immediate feedback of results to the learner (see Appendix A). However, it is difficult to isolate within the writings of the founders of SWRL (referred to in the following pages as the Laboratory) and the major developers of the communication skills program a specified philosophy or theory other than a major dependence upon empirical data and the self-correcting mechanism in the iterative "tryout, test, and revise" approach to product development.

An outside observer scrutinizing the product may be able to identify several basic principles of learning which are exemplified within it. The Skinnerian principle of reinforcement is built into the product at many levels. Teachers are trained to give brief positive feedback statements to correct responses. In addition, "good work" badges and tokens of achievement are included as part of the First Year Communication Skills Program. The emphasis on immediate feedback for correct responses also exemplified the Skinnerian "theory" of learning, which stresses the importance of the temporal relationship between a student response and ensuing reinforcement. In all cases, teacher instructions and materials are designed to provide

immediate and corrective feedback to a student's effort. The principle of modeling, the effectiveness of which has been demonstrated by a large amount of empirical data collected since 1960, is also built into the product. When a student responds incorrectly, teachers are trained to say the word or sound correctly and immediately elicit imitative response from the student. This modeled response is then reinforced.

It seems fair to say that the developers of the product, while knowledgeable about research in the domain of children's learning, did not think it necessary to build their product around the theories or philosophies of any position or person. Indeed, it is SWRL's general position that such theories are not in themselves especially heuristic in terms of generating specifications for learning episodes. They believe empirical data generated by research, irrespective of theoretical source, is far more useful. According to SWRL, people who are attempting to develop validated educational products should apply what they know about any and all theories in a no-holds-barred effort.

Description of Materials

Organization and Format of Materials

Materials for the First Year Communication Skills Program exist within two systems: an instructional system and a training system. The instructional system refers to the materials that will be utilized directly in the classroom, while the training system refers to those materials that will be used in instructing teachers and trainers of teachers in the proper procedures for utilizing the classroom materials. The latter system is referenced later in the section on teacher training.

The First Year Communication Skills Program provides ten units of classroom instruction, each requiring approximately three weeks to complete when utilized about one-half hour per day. These materials, which are used directly by the students, come as a package. Each package contains materials for one classroom. Pupil materials include 30 copies each of 52 storybooks, 10 criterion exercises, 40 practice exercises, one criterion exercise training lesson, and 8 comprehension sheets. The First Year Communication Skills Program also provides teacher materials which are included in a 6" x 8½"

file box containing 7 procedure cards, 26 alphabet cards, 116 flash cards, one criterion exercise training card, 2 oral work index cards, 10 activities and materials cards, 10 criterion exercise direction cards, 40 animal cards, 9 entry skills test cards, 15 file tabs and dividers, 12 class record sheets, 180 "good work" badges, one entry skills test record sheet, and one 23-page teacher's manual.

Cost of Materials to User

Cost per classroom is $94.20, or $3.14 per student for a 30-student classroom. At present, the teacher training is done at no cost to the user. It is estimated that when the First Year Communication Skills Program goes into commercial publication, the training materials will also be packaged and priced.

Procedures for Using Product

Learner Activities

One of the points emphasized in the communication skills program is that student or learner activities must be closely and concretely related to the objectives of the program. For example, the objectives of the program include that a child should learn to read 100 words with comprehension. The activities of the program are specifically geared toward giving him practice in the reading of those 100 words. This reflects a principle of programmed instruction which states that during an instructional sequence, the learner should be supplied with practice which is appropriate to the educational objective.

The activities of the First Year Communication Skills Program include oral exercises with special flash cards, reading the program books, and completing comprehension sheets. The teacher frequently administers criterion exercises, which are booklets of questions about the material just completed, in order to see how well the students are mastering the objectives of those materials. Students who do not perform well are given additional practice, either through small-group instruction or individual tutoring. Activities may also include playing a number of games. The teacher's manual includes directions for 25 such games, many of them based on flash cards and all designed to give the children relevant practice and review on content related to the objectives of the program. The First Year Communication Skills Program

(FYCSP) was designed to be used about 25 minutes per day. About three weeks are needed to cover each of its 10 units, yielding a 30-week program, or roughly one school year. Children have the opportunity to read short storybooks and are allowed to keep their own copy of the storybooks so that they can build a personal library and demonstrate their newly acquired reading skills at home.

In general, the communication skills program is designed to be used in a typical self-contained classroom utilizing group instructional methods. However, small-group instruction, team teaching, and individual tutoring may also be accommodated as methods for utilizing the program materials.

The instructional materials are designed so as to be intrinsically motivating. This means that they are visually attractive and call for activities that are presumed "fun" for most children, e.g., playing games or looking at cartoons. In addition, teachers are instructed to attempt to provide a classroom atmosphere that is non-threatening and that encourages all to participate. The emphasis at all times is on providing success. The children are rewarded as frequently as possible with either verbal praise or "good work" badges.

Teacher Activities

As was mentioned above, the teacher used the First Year Communication Skills Program in a group instructional setting and with individual students in a tutoring situation. The general instructional procedure requires that the teacher: (1) introduce the activities for each 3-week unit to all students; (2) administer a unit criterion test; and (3) provide individual practice exercises and materials for those who do not demonstrate mastery of certain skills. When working with a large group of students, teachers are encouraged to address their questions to individual children rather than the group as a whole. They are also asked not to address the question specifically to any one child until after it has been stated. They are to ask questions to which discrete answers are possible, and are to immediately respond to correct answers. Incorrect answers are not to be punished or scolded, but rather the student is immediately given the correct answer, asked to repeat it, and then rewarded appropriately.

Teacher training in the specific methods and procedures is provided in the form of a packaged training system that has been developed by SWRL. This consists of a program of audiovisual and individualized written material which teachers may go through in a one-day training session. This session is conducted by a person from the school district, usually a supervisor who has received instruction directly from SWRL in the proper techniques for conducting the training session. This training of the trainers allows district personnel to adapt the training for their teachers specifically to the conditions which exist locally. The training program consists of an audio-tape/filmstrip combination, a 16 mm. film entitled, "First Year Communication Skills Program: A Foundation for Success in Reading," and various written training materials. This training program is explained in detail in Appendix B. It is important to note that the teacher training and trainer training exercises are also a product of the Laboratory in the sense that they have gone through a product development cycle. The fact that more extensive utilization of media is exemplified in the trainer training system than in FYCSP reflects the greater availability of such technology to this population. It also reflects the greater sophistication in the use of these techniques by this population.

A minimum of out-of-class preparation is necessary to satisfy the requirements of the program itself. However, if the teacher is basing all classroom instruction on the SWRL materials, out-of-class preparation may be fairly extensive. At the upper bound, where the SWRL program constitutes the nucleus for the entire kindergarten curriculum, preparation will average about one hour per day. At the program-specific level, advance preparation of activities, maintaining progress records, scoring criterion exercises, and preparing individual tutorial or remedial work averages no more than 15 minutes per day.

Provisions for Parent/Community Involvement

The SWRL First Year Communication Skills Program, when marketed, will utilize two supplementary related support systems which are called the Parent-Assisted Learning Program and the Summer Reading Program. Both programs teach much the same content as the FYCSP. Parent-Assisted Learning stresses the involvement of parents in tutoring and reinforcing the learning

activities of their children after school. The Summer Reading Program is designed to maintain high level performance on outcomes that were produced as a result of the child's experience with the FYCSP during the kindergarten year. The development of a specific set of objectives and a diagnostic criterion-referenced measurement system based upon these objectives makes it possible for teachers to develop very specific prescriptions related to the needs of their individual students, and to send home specific remedial materials with instructions for the use of these materials by parents.

Special Physical Facilities or Equipment

No special facilities or equipment are required for utilizing the program.

Recommended Assessment Techniques for Users

Assessment is a crucial and continuing part of the SWRL First Year Communication Skills Program. Before a student enters the program, he is given a brief entry skills test which ensures that he has the necessary behavioral prerequisites to enter into the program. Approximately 90% of the kindergarten children tested do meet the entry level criteria. Thereafter, checkpoints are provided within all of the 10 instructional units to assess each child's progress. Before moving from one unit to the next, the child should have mastered all content from the current unit. The teachers are able to verify that their children have mastered the unit by administering the criterion exercise for that unit. Typically, an 80% level of correct responses is required, although this varied from unit to unit. Simplified scoring procedures for these exercises enable a teacher to quickly construct a record of each child's achievement on each outcome. This record serves as a basis for assigning additional instruction. Finally, the program provides a quality assurance (QA) system which is designed to provide evaluative feedback to users of the system at an entire school and district level; materials and procedures provided in the QA system are mid-year and end-of-year pupil performance tests, school-wide sampling plans and schedules, data processing techniques, decision rules for selecting alternative courses of action, and guidelines for evaluating program modifications.

ORIGINS

Key Personnel

At present, the Executive Director of SWRL is Dr. Richard E. Schutz. Dr. Schutz has been associated with the Laboratory since its inception in 1966. Dr. Schutz is a pertinacious apostle of the hard-nosed empirical view. This outlook is made patently obvious to associates, staff--and interviewers. His philosophy regarding educational development activities, in general, and the development of the program, in particular, is best stated in an article entitled, "The Nature of Educational Development," printed in the Journal of Research and Development in Education (1970). Summarizing this philosophy, Dr. Schutz views an educational product as an organized set of methods and materials packaged in a form that will consistently accomplish a socially useful outcome. According to SWRL via Schutz, the development of a product requires an optimal distribution of uncertainty-reducing research activities, routine engineering development activities, and organized production activities. The culmination of production is the installation or operational use of the product without further assistance from the developer. It is desirable that the product be used continuously, and that it consistently produce the instructional outcomes for which it was designed at a specified level of effectiveness.

A no-nonsense, matter-of-fact orientation is carried over into Dr. Schutz' personal demeanor, and, in fact, into that of the entire Laboratory staff. A good example of this demeanor is the following quote from Dr. Schutz' remarks to a group of publishers regarding SWRL (1971):

> Like the Holy Roman Empire, the three terms designating us [SWRL] as a Regional Educational Laboratory are only partially apt. Although we are located and embedded in this region, we serve the nation. Although we are dedicated to the demonstrable improvement of education, our staff is multidisciplinary. Although we have no lab coats or test tubes around, we do conduct sequenced, coordinated inquiry which reduces uncertainty concerning how to reliably produce prespecified outcomes [1].

Dr. Robert L. Baker, who currently serves as Director of the Laboratory Program, has served in various directorate capacities since the opening of the Laboratory in 1966. Dr. Baker received his Ph.D. degree from the University of Nebraska and joined the staff of Arizona State University in 1955 as

assistant professor and Director of the Bureau of Educational Research. When he joined the Laboratory in 1966 he was Professor and Chairman of Educational Psychology and Co-Director of the Classroom Learning Laboratory at Arizona State University.

Dr. Harry Handler serves as Director of Planning. Also an educational psychologist, with a Ph.D. from the University of Southern California, Dr. Handler came to the Laboratory in 1966 from the Los Angeles City Schools where he was the senior staff member in educational research and development.

Mr. William H. Hein, Jr., Director of Business and Operations, is an attorney, receiving his J.D. degree from the University of Nebraska, with a specialty in contract law. He has been responsible for all aspects of Laboratory business management and introduced the non-exclusive licensing procedures to facilitate distribution of Laboratory developed products.

Dr. Howard Sullivan, Director of the Product Development Division, has had program responsibility for the full development and testing sequence of the SWRL instructional systems. Dr. Robert Berger, Director of the Product Integration Division, has had program responsibility for the development and testing of SWRL training systems. Dr. Robert O'Hare, Director of the Division of Resource Services, has had managerial responsibility for all support functions including school liaison, production, and publication.

These managerial personnel all had personal responsibilities in making the First Year Communication Skills Program possible. Although Laboratory products are not authored by individual staff, the products are regarded as evolving reciprocally, utilizing individually authored research reports and analytic descriptions of product characteristics, functions, specifications, performance, and revisions. Such papers appear in SWRL publication series and in the general journal literature. In 1970, the Laboratory program documentation list included over 400 separate titles, which collectively record and credit the professional contributions of key staff.

Sources of Ideas for Product

As was mentioned above in the section on philosophy behind the product, a general recognition of basic behaviorist positions regarding learning, as translated by SWRL staff, is evident in the development of the First Year

Communication Skills Program. The data base for the FYCSP has been identified as consisting of three sources. The first source was a methodological approach generated during the period of 1961-1965 at Arizona State University in the Classroom Learning Laboratory. This research was funded at various times under the Cooperative Research Program of the Office of Education and Title VII of the National Defense Education Act. The second major source was research done on the reading process at System Development Corporation under Dr. Harry Silberman. The third source is represented in two papers by Dr. Edward B. Coleman of the University of Texas at El Paso entitled, "Collecting a Data Base for an Educational Technology" (1970) and "Developing a Technology of Written Instruction: Some Determiners of the Complexity of Prose" (1970). Coleman's papers present a possible integration of subject matter area with methodology.

The total data base thus provided information regarding some of the conditions under which children could learn to read more efficiently.

Evolution of Ideas for Product

During the initial attempt by the Laboratory to identify areas for contribution, Dr. Schutz, aware of the research mentioned above and working with Dr. Harry Silberman of System Development Corporation, formulated a set of program plans. The early objectives for the program were summarily identified as the development of reading proficiency, since reading was commonly agreed on as an important area in which major deficits then currently existed. These program plans were approved by the directors of the Laboratory and then were submitted in late spring of 1966 to 12 technical consultants who were professors of education, linguistics, speech, and psychology at universities across the nation (see Appendix C). This panel of consultants contributed ideas and suggested refinements, based upon their research in the domain of the early development of communication skills.

It is interesting to note at this time that although funding had been made available through the Federal Government for the development of staff capabilities and plans, the motivation to produce a concrete educational product at that time was unique to SWRL and perhaps one or two other regional laboratories. The entire development strategy of the Laboratory was identified

at that early period as being based on products, the effectiveness of which could be evaluated in terms of student attainment of important performance outcomes. In addition, the forthcoming products were to be so simple, efficient, and inexpensive that they would be applicable in any classroom in the country. Finally, the emphasis was on utilizing programmatic development activities and self-correcting mechanisms, continually revising the products until these basic tenets had been achieved. The evolution of the First Year Communication Skills Program is SWRL's prime example of this approach.

Funding for Product

The Southwest Regional Laboratory is an educational laboratory established under Title IV of the Cooperative Research Act. Operating funds come mainly from the Department of Health, Education, and Welfare, and are expended exclusively on educational research and development projects. The regional laboratory program was established to translate research findings into products, procedures, and processes that can be used in the schools to improve the quality of education. Since the beginning of the regional laboratory program in 1966, SWRL has been consistently one of the best funded of the laboratories. From an initial funding level in 1966 of over $400,000, SWRL's annual budget has risen to its present point of over $3 million, which places it second among the regional laboratories in terms of annual budget. Those laboratories that initially so emphasized the rapid development of validated educational products within an identifiable area of subject expertise are those that have best survived and prospered.

The Laboratory staff is organized into divisions (see Figure 6) based on functions pertinent to product development rather than projects pertaining to individual products. Each Laboratory division provides a special function related to the development of products, and each division contributes to all products which come out of the Laboratory. For example, in the development of the First Year Communication Skills Program, each of the four divisions played a special role. Product Design Division provided linguistic and basic psychological research related to program specifications. The Product Development Division dealt with developed and verified instructional materials and procedures. The Resource Service Division provided school liaison and

production support. And, finally, the Product Integration Division developed the training system.

The functional organization of divisions makes it difficult to break down individual development cost by category or component for the First Year Communication Skills Program. When queried about the costs of bringing the program to market, Dr. Schutz responded that although various answers could be given, the question is naive. He asserts that the question is as misplaced as asking how much it cost specifically to get Apollo 14 off the launching pad, and argues that it would clearly be unfair to require the First Year Communication Skills Program to bear the entire amortization of the $11 million invested in SWRL since 1965. He contends that one could ignore the instructional products emerging from SWRL and argue the First Year Communication Skills Program cost nothing because the scientific knowledge and development technology generated during the five years since the founding of the Laboratory is a bargain at $11 million. The perspective advocated by the Laboratory is to regard the FYCSP on its own merit, and to evaluate it in terms of its future market potential, recognizing that more research and development was performed in connection with this product than any other yet published.

In short, we were unable to get an estimate of product costs or any breakdown of costs from the Laboratory. Based upon our own review of information regarding number of staff on the project, time spent, etc., we estimate a development cost in excess of $2 million. However, it should be noted that the First Year Communication Skills Program is the primary product resulting thus far from the $11 million investment.

PRODUCT DEVELOPMENT

Management and Organization

Characteristics of Development Agency

As noted above, the Southwest Regional Laboratory is a regional educational laboratory funded by the USOE. It was founded in 1966; the original staff were located in three separate geographical entities. These three locations were: the central program at Inglewood; a staff training outpost manned by personnel housed in Tempe, Arizona; and a major subcontract for

instructional technology activities initiated with Systems Development Corporation in Santa Monica.

The development of the First Year Communication Skills Program began in the Inglewood setting in early 1966. By late fall of 1966, the full time staff of the Communication Skills project had grown to approximately 15. This staff was composed of Ph.D. level people, subject matter discipline specialists at the master's level, and support staff. The ratio of the latter to the former was about 2 to 1. The organizational structure of the Laboratory at this period, about April, 1966, is contained in Figure 1. As can be seen, the Communication Skills project at this time occupied a position which is substantially different from its current position. At that time, it was an identifiable entity in and of itself. However, it became increasingly obvious that continued expansion of the separate Inglewood curriculum projects, i.e., the Problem Solving project and the Communication Skills project, would lead to increased duplication and conflict of efforts in terms of the total SWRL structure. Each project found it most convenient to request its own logistical support system, its own artists, its own people to make contact through schools, and so forth. The direction was clearly toward independent projects with no greater compatibility than the subject matter discipline departments of schools and colleges. At this time it was decided that further differentiation of functions rather than projects was a desirable goal for the Laboratory organizational structure. The changes that took place at this time, December, 1966, are represented in Figure 2. It can be seen that Communication Skills and Problem Solving became sub-modules of a larger element called Instructional Design. Communication Skills was still responsible for conducting the research that would lead to the development of specifications for instruction. However, the other elements, entitled Instructional Development, Instructional Technology, Staff Training, and Shared Functions, were responsible for converting the specifications developed by the Communication Skills module into materials and procedures which comprised a product suitable for classroom tryout. The actual conduct of the evaluation-revision cycle would then be the responsibility of the Quality Verification module of the Instructional Development element.

To illustrate how operation of a self-correcting mechanism within projects can affect the entire organization, consider the course of the

Figure 1

Proposed Organization Chart

Southwest Regional Laboratory
for Educational Research and Development

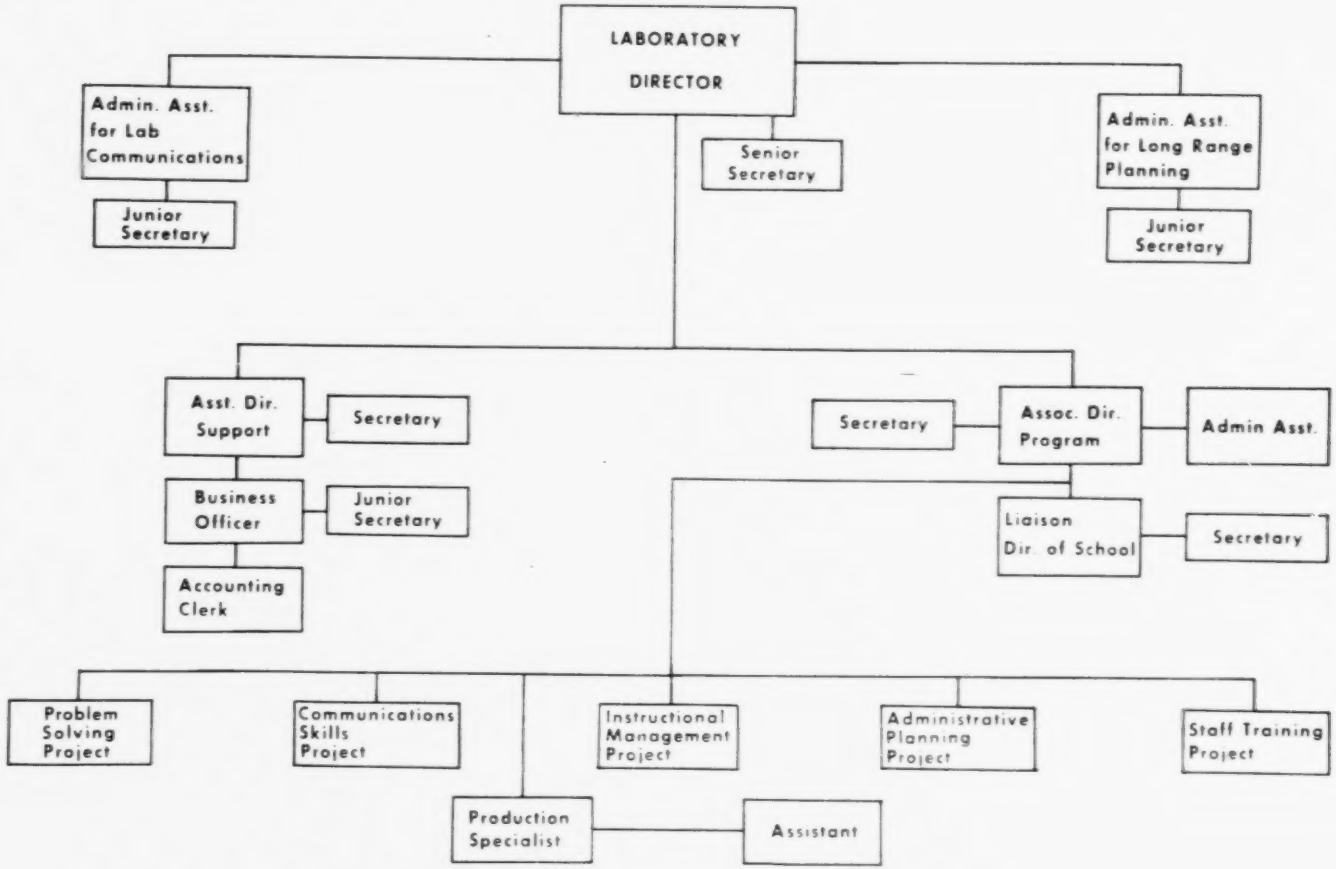
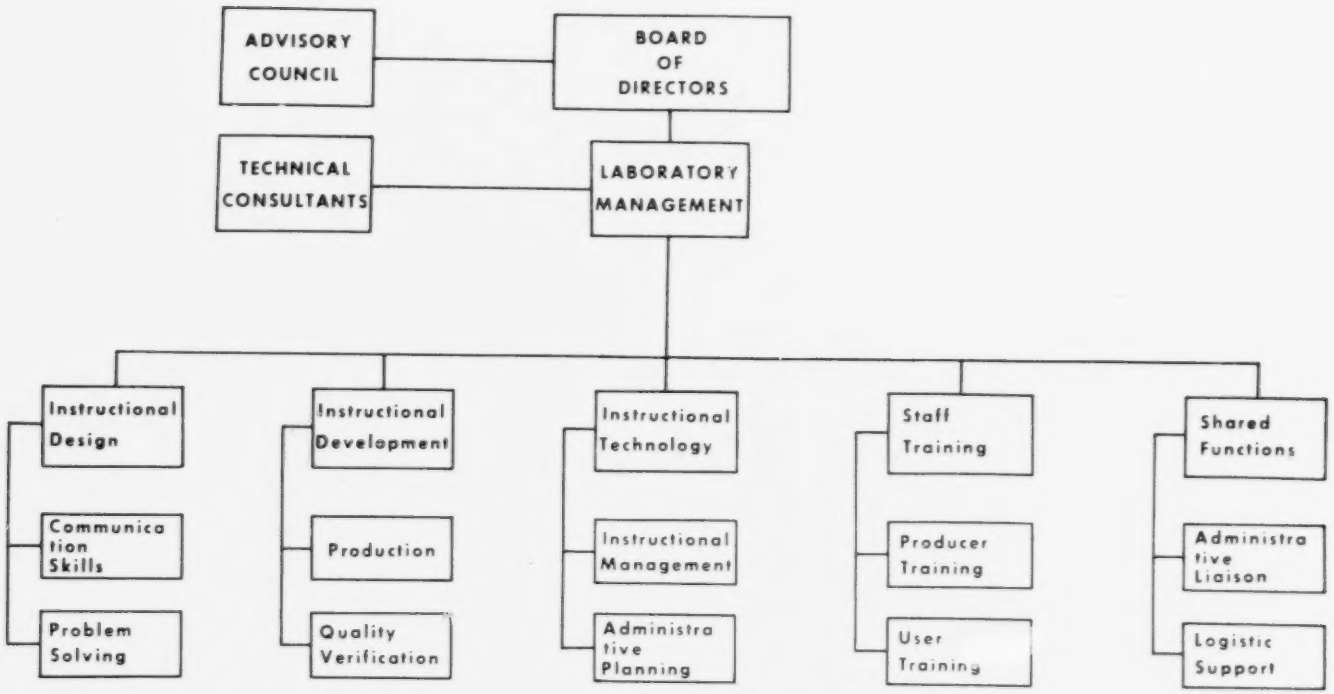


Figure 2

Functional Organization Chart

Southwest Regional Laboratory
for Educational Research and Development



Instructional Design and Instructional Development elements within the next year. Originally, it had been thought possible for development personnel to prepare prototype instruction from specifications prepared by design personnel. This proved impossible with the personnel and technology then available. Development personnel complained that the specifications prepared by design personnel were incomplete; and design personnel complained that the prototype instruction prepared by development personnel misrepresented the original formulation.

An attempt was made to improve this situation by requiring design to accompany specifications with prototype instruction that had been refined to the point that it accomplished its intended objectives with at least two individual children. This tended to reduce production to an assembly line role. On the other hand, when any modification or extension of the product was required beyond the prototype, the same difficulties as described in the previous paragraph were encountered.

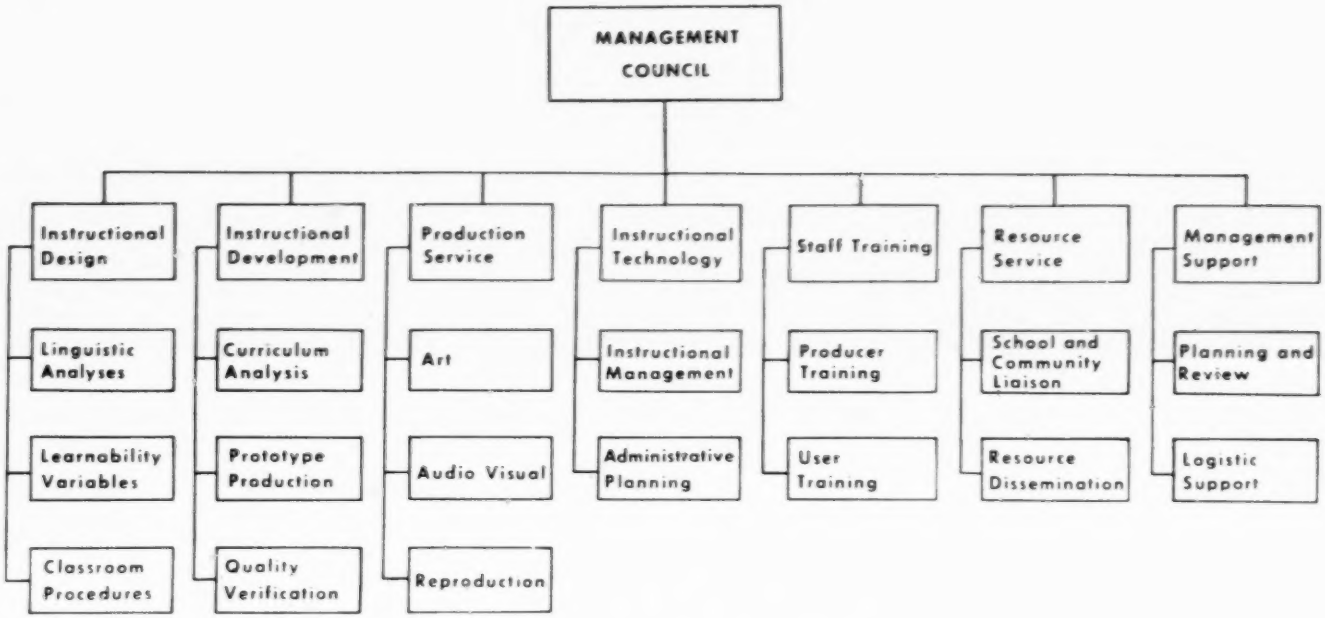
As a result, the design and development elements were re-conceptualized and a new organizational structure, May, 1967, which is reflected in Figure 3, came about. At this time, the identity of the Communication Skills project was lost, and in its place came the functional organization of activities that now is seen in SWRL structure. Design activities were now aimed not at preparing specific instructional specifications based on the objectives of a project like the First Year Communication Skills Program, but rather at providing data to be used as a basis for future instructional specifications. For example, the Linguistic Analysis unit began working on modifications of Laboratory materials for Spanish-speaking children, on linguistic analyses leading to spoken language instructional materials, and on the identification of linguistic characteristics of instruction that contribute to ease of comprehension. The Instructional Development element now included all activities associated with instructional products being developed. Under this element, Curriculum Analysis was concerned with preparing instructional specifications for specific products. The Prototype Production and Quality Verification units continued to perform the functions associated with their names.

This organization was somewhat unwieldy and was consolidated in August of 1968 into the form represented in Figure 4. This reduced the number of

Figure 3

Program Elements

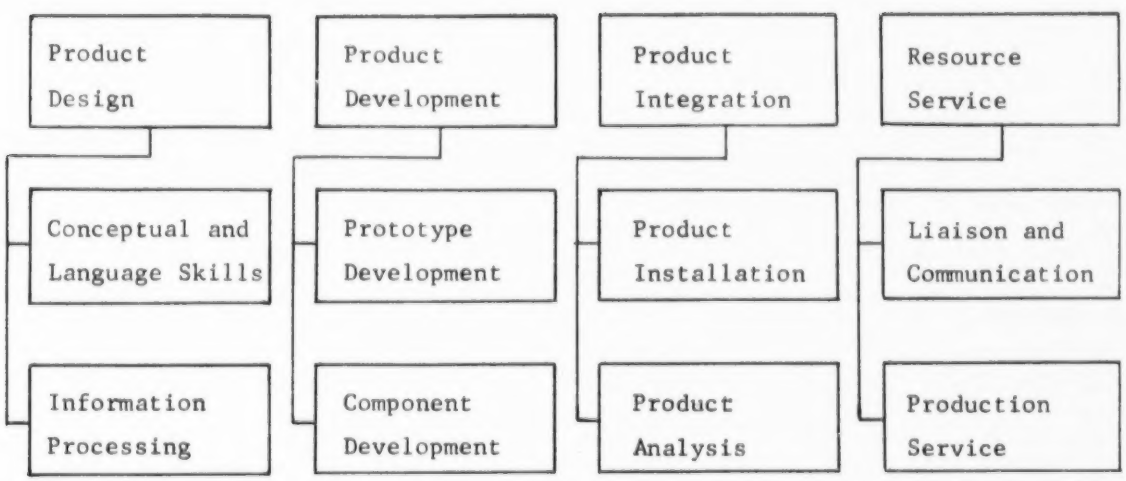
Southwest Regional Laboratory
for Educational Research and Development



May 1, 1967

Figure 4

Laboratory Program
Southwest Regional Laboratory
for Educational Research and Development



element heads to 4, and gave an overall Laboratory organization that is represented in Figure 5. An analysis of Figure 4 reveals that the completion of the first generation of staff training instruction provided the opportunity to consolidate the staff originally housed in Tempe with the Inglewood staff, and to relate further staff training activities directly to Laboratory-developed products. Therefore, Staff Training lost its identity and became a function of Product Integration. The fact that the Communication Skills Program was nearing the stage where large scale field tryouts (with emphasis on installation requirements) with school personnel were required dictated that a new responsibility related to relationships with schools would soon be necessary. Again, this resulted in the development of the Product Installation unit along with a specification of function for the Liaison and Communication unit under the Resource Service element.

By May of 1969, other adjustments appeared in order. The term "element" had never been meaningful outside of the Laboratory. Therefore, the designation "element" was changed to the designation "division." This organization is reflected in Figure 6, which is the current Laboratory organization.

The emphasis on functional organization should be stressed. The modifications of the Laboratory structure have been away from those which assist performance in terms of organizational roles toward a mission-oriented structure, which assesses performance in terms of demonstrable accomplishment. SWRL has successfully, in their own opinion, de-emphasized the concerns of who and where program activities are accomplished, and has moved toward a flat structure composed of functional program elements. Each modification of the Laboratory's internal structure has added empirical referents to the meaning of educational development.

No other agencies were involved in the development of the First Year Communication Skills Program.

Original Development Plan

Given the general goal of producing a functioning and practical educational product which would result in the "development of reading proficiency" in learners, development began during the late spring of 1966. It was planned that initial objectives and prototype instruction materials would be constructed according to the product development cycle shown in Appendix D.

Figure 5

Laboratory Organization
Southwest Regional Laboratory
for Educational Research and Development

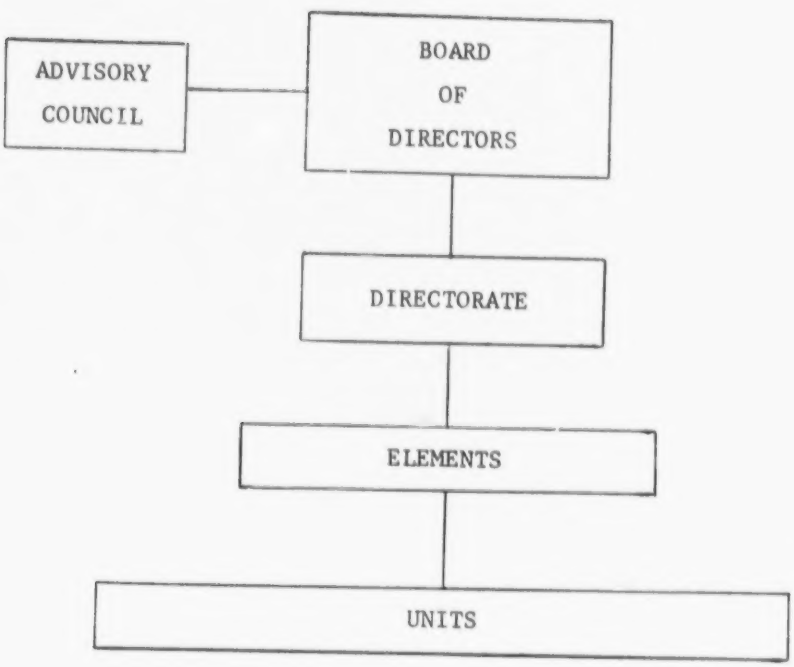
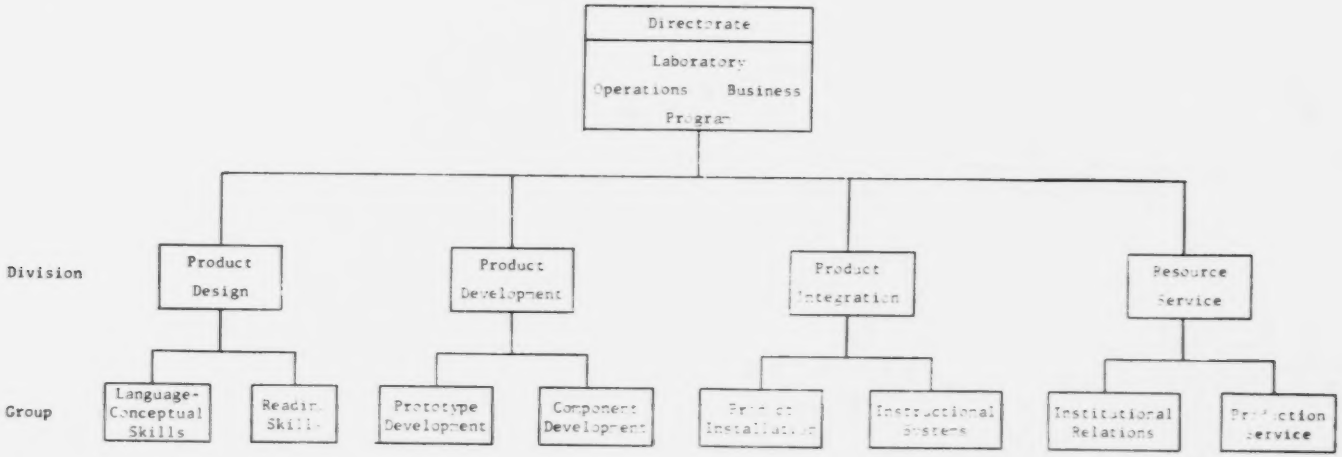


Figure 6

Current Laboratory Organization
Southwest Regional Laboratory
for Educational Research and Development



May 1, 1969

Materials and procedures were to be tried out with one or two learners representing the potential target population. These would be consolidated into components which would be reviewed in-house then tried out in field tests examining the performance of the product in attaining its designated outcomes under applied circumstances. The final stages, once performance specifications had been achieved, would involve preparation for installation. It was never intended that SWRL would disseminate or market the program on a wide scale.

Modifications of Original Development Plan

Appendix E presents the SWRL Instructional Product Development Stages which represent the actual development cycle for FYCSP. A comparison with Appendix D, the "ideal" product development cycle, reveals a heavier emphasis on installation and program coordination, and a lack of emphasis on development analysis or the written summarization and evaluation of the "completed" product cycle. It is apparent that some of these modifications were necessitated by the desire to produce a coordinated set of products for the development of proficiency in elementary level communication skills (e.g., First, Second, Third Year Communication Skills Programs, Parent-Assisted Learning, Summer Reading, and Instructional Concepts Programs, etc.). More important is the development of an "installation" stage, which shows realization of the need to achieve widespread implementation of the Communication Skills Program in existing school instruction. This realization came about as the developers began to identify the potential barriers to school implementation, such as extant classroom management skills, the need for teacher training, etc. More data on this stage are presented below in the section on product development.

Actual Procedures for Development and Formative Evaluation

In 1966 a prototype version of FYCSP was developed. True to the Laboratory's stated approach (see the preceding section, Philosophy and Theories Supporting Product) conditions suggested by empirical research were transposed into initial materials with immediate emphasis upon the iterative "tryout, test and revise" approach. Review of prototype materials

by other specialists, armchair evaluations and revisions are noticeably absent. Development, tryouts with target audiences, and formative evaluations are integrally woven together. For an overall view of the process, the reader may peruse the major event flow chart on pages 24 - 25.

First Prototype

A development group consisting of eight SWRL staff members and 12 teachers was formed during the late spring and early summer of 1966. Prototype eight-week instructional sequences were designed to result in learner attainment of the following outcomes: (1) sight letter discrimination; (2) phonic word-attack skills; and (3) comprehension of what was read. Individual learners, usually no more than two students at a time, were taught these objectives, using techniques which had been identified as effective by work at the Classroom Learning Laboratory and at the System Development Corporation. Simple performance measures were used to assess achievement. Techniques which did not result in desired student performance outcomes were revised until they did.

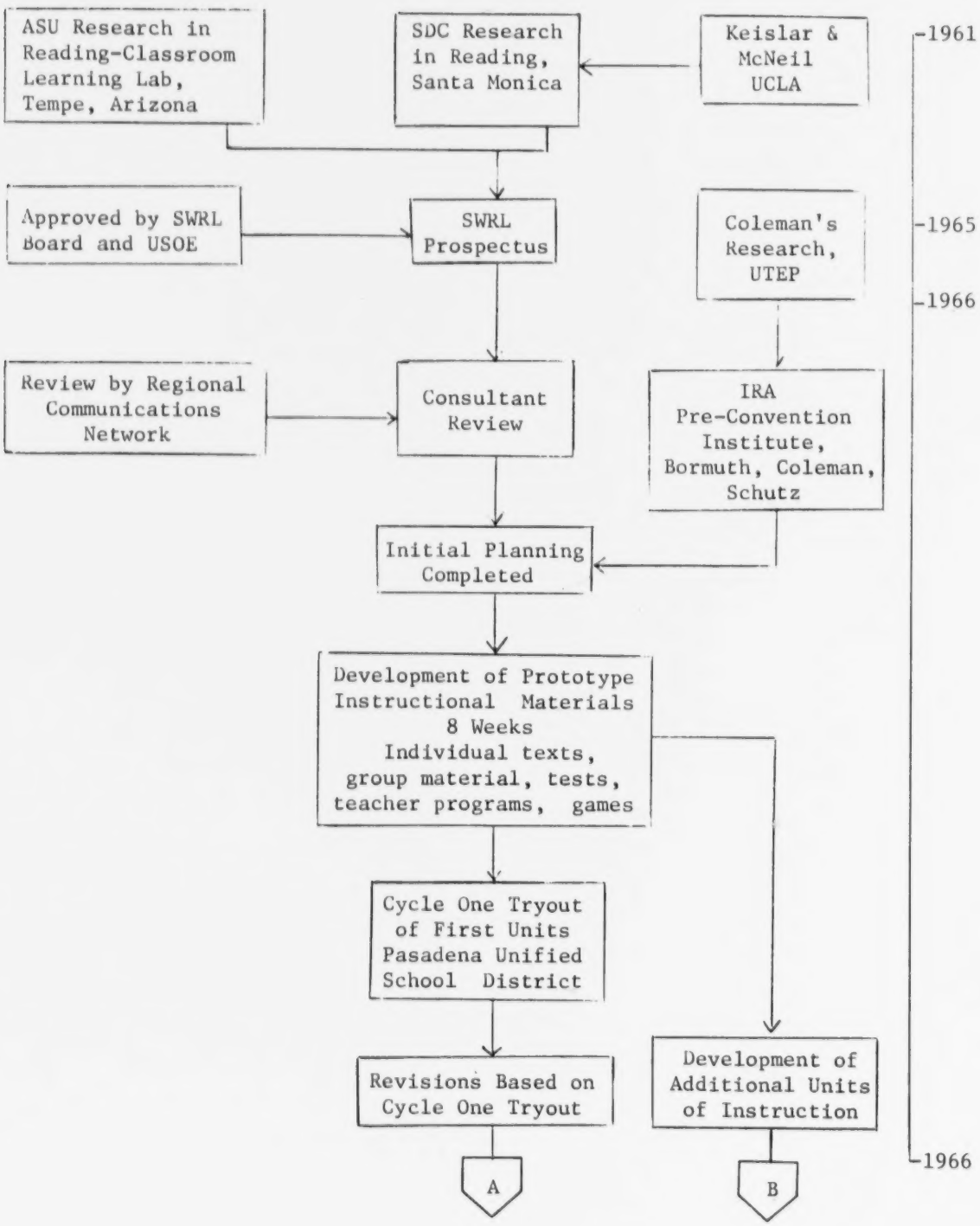
The 1966-67 Tryouts

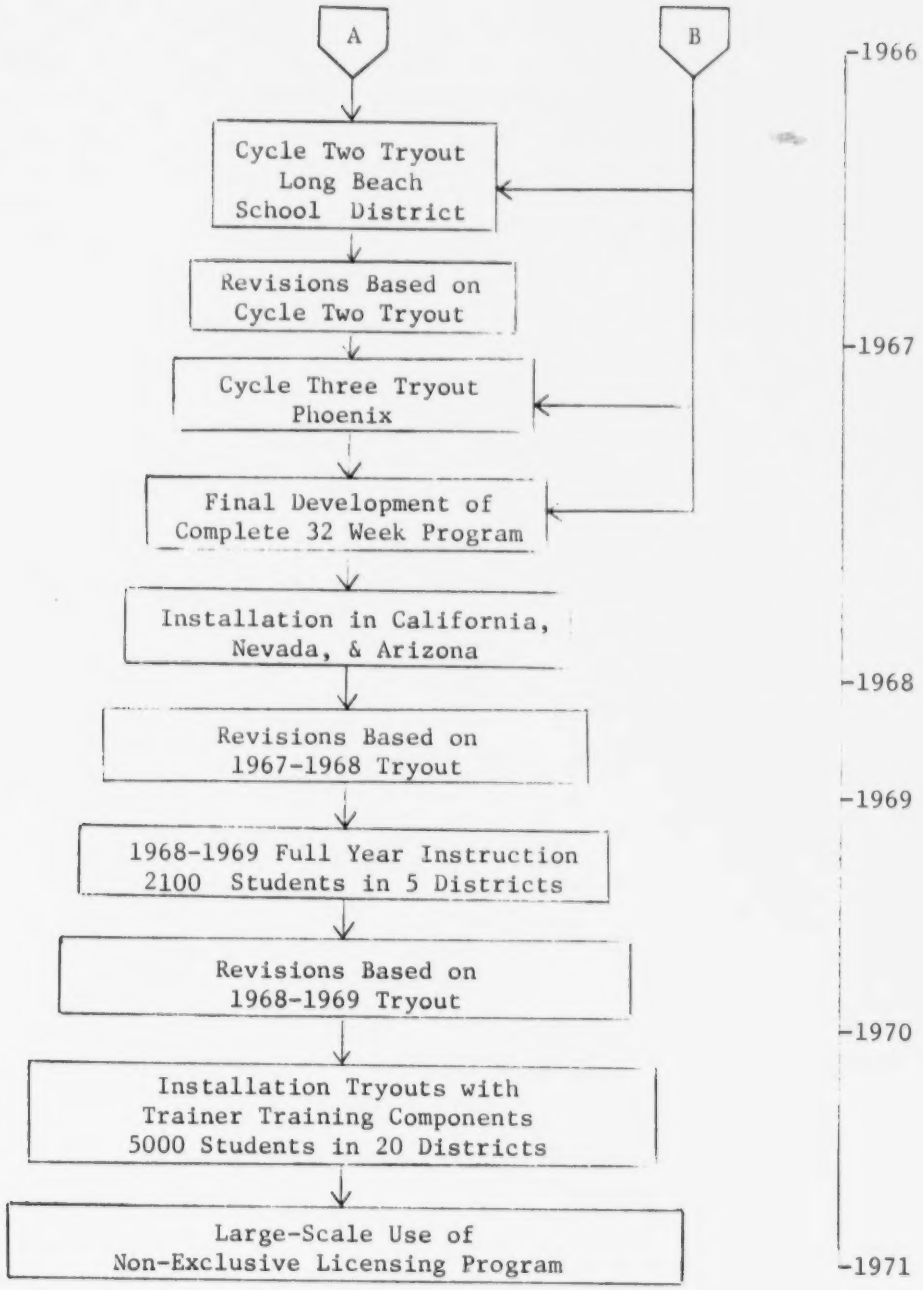
During the fall of the 1966-67 school year, tryouts of reading materials from the program were conducted in kindergarten classes in four school districts in the SWRL region. Prototype materials had been brought together to form an eight-week instructional sequence. The initial development tryout was held in the Pasadena City School District. Three kindergarten teachers participated in the tryout and each teacher used the material with one class only. The tryout was conducted for a period of eight school weeks beginning on November 14, 1966, and ending on January 27, 1969. This tryout permitted evaluation of the materials and methods of presentation in the type of environment in which the materials were subsequently to be used, thus enabling the Laboratory to identify effective presentation methods and important strengths and weaknesses of the material. In turn, this information enabled the refinement of the instructional materials for further tryout.

At the conclusion of the eight-week period in Pasadena, a more extensive tryout of the communication skills materials was conducted in the Long Beach Unified School District during a six-week time period from January 9 to February 24, 1967. Two teachers and four kindergarten classes participated

Figure 7

Major Event Flow Chart


ASU Research in Reading-Classroom Learning Lab, Tempe, Arizona
SDC Research in Reading, Santa Monica
Keislar & McNeil UCLA
1961
Approved by SWRL Board and USOE
SWRL Prospectus
Coleman's Research, UTEP
1965
1966
Review by Regional Communications Network
Consultant Review
IRA Pre-Convention Institute, Bormuth, Coleman, Schutz
Initial Planning Completed
Development of Prototype Instructional Materials 8 Weeks Individual texts, group material, tests, teacher programs, games
Cycle One Tryout of First Units Pasadena Unified School District
Revisions Based on Cycle One Tryout
Development of Additional Units of Instruction
A
B
1966


A
B
Cycle Two Tryout
Long Beach
School District
Revisions Based on
Cycle Two Tryout
Cycle Three Tryout
Phoenix
Final Development of
Complete 32 Week Program
Installation in California,
Nevada, & Arizona
Revisions Based on
1967-1968 Tryout
1968-1969 Full Year Instruction
2100 Students in 5 Districts
Revisions Based on
1968-1969 Tryout
Installation Tryouts with
Trainer Training Components
5000 Students in 20 Districts
Large-Scale Use of
Non-Exclusive Licensing Program
1966
1967
1968
1969
1970
1971

in the Long Beach tryout. Principals and teachers were volunteers; training, observation, and data collection were provided by SWRL. The principal aim of the tryout was to test revisions of the instructional materials with the hope that higher levels of pupil performance than had been attained in the Pasadena tryout could be obtained. The decision was made to utilize a different population of learners rather than going back to Pasadena because of the desire to replicate and generalize on the findings generated in Pasadena. In trying out the revised program an attempt was made to limit the amount of class time devoted to instruction to 20 minutes for each kindergarten class per day.

A third and final cycle of developmental tryouts during 1966-67 was held in Clark County School District, Nevada, and in the Diocese of Tucson, Arizona, schools. As a result of the earlier tryouts, it was agreed both by Laboratory personnel and the participating teachers that more words should be taught during the early weeks of the program. Thus, the materials were revised to include more words in the initial weeks, and the revision of the first six-week unit was field tested utilizing two teachers and four kindergarten classes in Clark County, and three teachers and four classes in Tucson. These tryouts also provided the Laboratory with an opportunity to obtain information on appropriate procedures for supplying materials and monitoring their use in districts without regular face-to-face contacts with the Laboratory.

An attempt was made throughout the first year of these tryouts to involve classes representing a variety of ability levels and socio-economic and cultural backgrounds. Among the participating classes were: a racially mixed, lower socio-economic class; two classes composed exclusively of Negro children; two classes in which the majority of the children's parents are college graduates; and two classes composed predominantly of Mexican children from Spanish-speaking homes.

The 1966-67 tryouts resulted in several important changes in the instructional materials and procedures, as well as in the monitoring and evaluation methods employed by the Laboratory. Some changes in the materials and procedures were initiated by comments and suggestions from the participating teachers, while others were a direct result of pupil performance data indicating relative weaknesses in certain parts of the instructional program. The following are some of the specific changes which were made:

1. The materials required for each lesson were repackaged together into a single kit for that lesson. The teacher's manual was also made to reference the lessons for each day.

2. Two separate formats were developed for the storybooks read by the children. The Read-With-Teacher books contain a teacher-read script on the left-hand page of the two-page spread, and a picture and child storyline on the right-hand page. In this revised format the teacher could read the left-hand page to the children, who in turn could read the right-hand page, and so on throughout the story. This format permitted a more interesting story plot despite the limited reading vocabulary of the children. The basic books continued to use the more familiar format in which children read the entire story. The maximum length of both types of stories was set at 15 children's pages because of teachers' comments on the optimal length for classroom instructional activity.

3. The instructional exercises in the program were revised to include more student practice in analyzing new words phonetically, and in identifying and producing given letter and phonogram sounds in a variety of words in which the sounds appear. This change reflected concern with the relative inability of students in the 1966-67 tryouts to pronounce correctly new words whose components sounds they had learned.

4. All materials were printed in traditional orthography. The 1966-67 tryouts revealed that children were able to read with little difficulty materials printed in traditional orthography after only a short amount of instruction with traditional alphabet characters. However, the data also indicated that children receiving instruction only in the traditional alphabet experienced great difficulty reading materials printed in orthography. Thus,

they had little opportunity to develop their newly acquired reading skills with words commonly found in their environment, since the environmental material is printed only in traditional orthography.

5. Individual testing procedures, used sparingly during the 1966-67 tryouts, were systematically built into the 1967-68 revision because they yielded highly useful data and were accepted well by the participating teachers.

6. It was found worthwhile to designate a single district-level administrative contact through which the SWRL representative could work with the participating teachers in a district.

Much of the data generated during the 1966-67 tryouts was not overly encouraging. Many students did not achieve the criteria. A need to cope with staff pessimism may be indicated by the following statement made by Dr. Schutz (1970 b) in his paper on programmatic instructional development:

> One of our biggest personal adjustment problems is what I call the "whipsaw" dilemma. Inevitably, before a given development effort is completed, its limitations and defects are clear to all who have contributed to it. Each staff member tends to assign himself personal blame for these limitations, not realizing first that the ability to identify the limitations is probably limited to those intimately involved with the development, that the anticipated dire consequences of the limitations may well be overestimated, and finally that the removal of these limitations is the basis for one's job in the future [10].

A result of the early tryouts was the finding that certain attempts to employ more sophisticated technological tools within the classroom were impractical. For example, an attempt had been made in the early prototype materials to provide student feedback on chemically treated answer sheets which changed color when marked by a pencil. Incorrect responses would turn red when marked, while correct responses would turn green. In the classroom situation it was found that children had so much fun eliciting these colors that they soon marked all the items, whether they were right or wrong, and there was no way

to determine the intended student response. Since the emphasis of the product was to be on functional and simple procedures, chemically treated answer sheets were dropped until a later time.

During the tryout phases, data were collected both in the form of criterion-referenced tests, which had been developed by the Laboratory staff based on the objectives of the prototype material, and in unstructured form directly from the participating teachers. Classroom observation was also conducted. It was found that there were two classes of information to consider regarding the impact of the beginning reading program. SWRL's experience indicated that, accordingly, two different criteria were needed for making judgments about needed improvements. The first was public approval, which refers to the acceptance or rejection of the program by its potential users. The second was pupil performance, which refers to the effectiveness of the program in producing the desired outcomes in learners. Unfortunately, the first criterion is the only one that is traditionally applied in making curriculum adoptions. In actual practice, performance outcomes are seldom a significant factor in curriculum adoption. They are crucial, however, to useful curriculum revision.

The FYCSP materials were designed to achieve some success on both criteria. The glamour materials, such as the short illustrated storybooks and game-like classroom activities, were received by teachers with pleasure. On the other hand, it was felt that student materials related to the teaching of specific word-attack skills, phonic sound blending skills, and so forth, required the kind of structured tutoring that teachers were not extremely happy with. To quote an anecdote from Howard Sullivan (1968):

> During the time of the initial tryout, teachers were not happy with the amount of structure in the procedures described for use with certain types of lessons in the program. Neither was I. I thought it should be more structured; they thought it should be less. We emphasized that the structure was essential for controlled evaluation purposes, and the teachers agreed with our reasoning. But the classroom observers found a great deal of variation in the extent to which the prescribed procedures were followed. Teachers frequently expressed concern about the amount of structure in the program. They liked the large supply of materials but they disliked the binding directions for using them [10-11].

When user appeal conflicted with student performance, the latter was given priority.

The 1967-68 Tryouts

The 1967-68 tryouts were carried out in 18 kindergarten classes in ten schools in California, Arizona, and Nevada, involving a total of 533 children. At this stage, a complete 30-week program had been developed. Feedback from the previous year had resulted in revisions to the program including an increase from a 50- to a 90-word vocabulary, more specific phonics instruction, examination of grouping procedures, and more emphasis on individual testing because of the valuable data yielded for evaluation of instruction. As in the first year, teachers using the program were volunteers and the Laboratory continued to provide extensive and intensive support. One day of orientation and three additional one-day conferences for school personnel were held during the year. SWRL produced and supplied all instructional and training material at no cost to the schools, and reimbursed the costs of school personnel attending the conferences.

Feedback from the 1967-68 field tryout was extremely encouraging. In general, the program succeeded in producing the desired student outcomes. Objectives dealing with letter-to-sound correspondence were achieved with an average of 68%. Average percentage achieved for word recognition objectives was 71%. Achievement level for letter naming objectives was 89%, and the percent for sentence reading objectives was 71%. These percentages represent the test scores of children on objectives which were part of the program. Other objectives were tested for which the children had not as yet received direct practice. Performance on these objectives represented transfer of learning. For example, on the ability to pronounce previously unencountered combinations of printed letters, children scored at the 39% level. Such achievement was greatly encouraging since the children had not yet been given direct practice in phonically blending printed letters. In contrast, baseline data previously gathered on uninstructed children showed no child able to blend an unfamiliar printed combination when only letter-to-sound correspondences had been learned and no direct blending practice was provided. Comprehension questions also represented a type of transfer task for which children had received no systematic practice. Participating children were able to answer 54% of the questions testing reading comprehension.

Public approval evidence was also very encouraging. Reports from school principals and parents were predominantly positive, and teacher ratings tended toward the highest scores on questions related to the First Year Communication Skills Program.

The 1968-69 Tryouts: Emphasis Upon Installation Requirements

During the 1968-69 school year, SWRL carried out a full-scale implementation study. The purpose of this study was not only to collect data related to the improvement of materials and procedures, but also to identify the elements necessary for full-scale installation of the program during the 1969-70 school year. This involved the identification of management, training, and evaluation system needs related to the installation of the First Year Communication Skills Program.

Program installation as a specific task and focus of research in the developmental cycle had received little attention from prior researchers. The responsibility of the curriculum developer usually ended with the production of the materials and the instructional guides for the teacher. The 1968-69 tryout attempted to develop an awareness of the possible pitfalls of such a limited developmental procedure and to identify management, training, and evaluation needs related to the installation of an instructional product. Management system needs involved the necessary procedures, personnel, and materials required to carry out the prescribed pupil instruction. Training systems provide school personnel with the requisite skills necessary for handling the prescribed tasks. Evaluation systems serve two major functions in program installation. The first is to provide information on the effectiveness of the training and management systems; and the second is to provide estimates of overall program effectiveness in the classroom settings where the program may eventually be used. This requires data related to the level of pupil mastery on the program objectives and on the level of program acceptance by potential users.

The 1968-69 sample included approximately 2,100 children from 26 schools and five urban districts in three states. The districts were located in Clark County, Nevada; Culver City, California; San Diego, California; Scottsdale, Arizona; and Torrance, California. The criteria for sample selection were that:

1. the program be used on a district-wide basis;
2. districts be distributed across the region; and
3. each district provide a coordinator to carry out the orientation and training of teachers.

Primary data sources for the study were district supervisors, classroom teachers, pupils, parents, and the school principals. Specified for each data source were information requirements about the program and its participants. In all, 23 items of information were collected utilizing the following instruments:

1. A pupil data form which was a class roster containing the name, sex, age, entry skills test score, etc., for all students participating in the tryout.
2. A weekly activity log designed to monitor class progress in the program by having the teachers report the number of minutes per day spent on the SWRL-related activities, number of children individually assessed, etc.
3. A class record sheet used by the teacher for recording pupil scores following a criterion exercise.
4. Questionnaires developed for teacher, parent, and principal evaluation.
5. A teacher observation scale--a classroom observation instrument utilized to determine the extent to which participating teachers demonstrated desired instructional behavior.
6. An activity preference form which was an attitude scale developed to determine differences in pupil attitudes toward SWRL and non-SWRL instruction.

Installation personnel were interested in assessing the validity of two commonly held assumptions made in relation to installation strategy. The first assumption was that the only requirement for effective teacher use of a new product is a comprehensive teacher's manual. Consistent with this

assumption, primary reliance for teacher training in the 1968-69 school year evaluations was placed on the SWRL teacher's manual and/or a brief orientation meeting with selected district personnel. The second common assumption was that additional teacher training requirements (e.g., for functioning in a complex instructional system) can best be satisfied by providing a few district personnel with a verbal walk-through that gives the rationale of the program. It is usually expected that these trained personnel will, in turn, be able to train adequately the teachers of their districts.

The teacher's manual contained comprehensive information on the rationale, content, organization, and procedures of the program. The teachers indicated on their questionnaires that they thought the manual was complete and well organized. Despite their high regard for the manual, however, observation of classroom instruction, analysis of instruction, the weekly logs, and other questionnaire data indicated that many teachers were not using a number of the specified procedures. Part of the difficulty was identified as the lack of incentive or effort to read the manual carefully. A few teachers candidly admitted that they had not read the manual at all. Others skimmed over the manual briefly at the start of the program but had seldom used it thereafter. The assumption that teachers could and would carefully read and use a teacher's manual had little justification.

A one-day training session was developed for district personnel having responsibility for implementing the program within their respective districts. Following this orientation, the supervisors used different approaches in training teachers. In three districts, the supervisors conducted teacher training themselves; in the other two, the teacher training was conducted by principals and other supervisor-appointed representatives. Teachers who participated in these orientations or training sessions reported that the information provided was useful but incomplete as a preparation for using the FYCSP.

In order to determine teacher training requirements, a behavioral analysis of teacher-administered instruction was performed. A sample of teachers using the program was observed and specific areas of need were identified. Some example findings are as follows. The number of overt pupil responses made per minute in each class ranged from a low of 2.04 to a high of 6.92. The average response rate for the nine observed classes was 4.16 per minute. Only three of the nine teachers observed allowed a ratio of at least two individual

student responses to every class choral response. One teacher did not elicit a single individual student response during the observation session. During the observed lessons, the teachers praised individual pupils or the class as a whole an average of 2.53 times. When divided by the average instructional time, this comes out to about one praising statement for every six minutes.

As a result of these findings, several teacher training objectives were derived. The objectives were:

1. To distinguish between appropriate and inappropriate stimulus materials and response practices for skill development, given examples of the lessons for each skill.

2. To identify practice situations conforming to individual practice requirements, given examples.

3. To identify appropriate situations for confirmation and praise statements, given examples.

4. To identify appropriate procedures for dealing with wrong responses and non-responses, given examples.

5. To distinguish between desirable and undesirable prompting procedures, given examples of each type.

6. To distinguish between instructional activities which are likely or unlikely to generate a response rate of at least six individual responses per minute.

Because of the number and complexity of teacher training objectives, it was decided that district personnel new to the First Year Communication Skills Program could not be expected to carry heavy instructional burdens in training teachers, unless far more lengthy and intensive training was provided them. It was decided that a self-contained training materials package would be developed to enable district supervisors to manage the teacher training without having to assume major instructional responsibility.

Analysis of pupil performance data during the 1968-69 tryout indicated that many of the pupils who failed to reach criteria on the unit criterion exercises were not given remedial instruction by the teachers. It was also

found that in those instances where remedial practice was provided, teachers were interested in observing the effects of such instruction. Based on this information, the unit instructional sequence was redesigned to build in a second instruction and retesting cycle as part of the basic instructional system. Other changes involved the development of a reinforcement procedure utilizing "good work" badges. Since it was observed that some teachers either failed to use the suggested instructional procedures or reported difficulty in using them, it was determined that the teacher's manual was too bulky to use conveniently as a reference aid during instruction. Small cards, on the other hand, were found to be easy to use since they could be referred to readily during instruction. In addition, they could be stored with flash cards and coded for easy filing. Based on this information, procedure cards were developed for all basic instructional or clerical tasks for the 1969-70 revision. Finally, of particular concern to many teachers was the logistical problem encountered in pacing instruction for both fast and slow learners. Despite a recommendation to do so, few teachers were observed to assess pupil performance on a regular basis. In those instances in which individual pupils were assessed daily, teachers seldom called on a representative group of pupils in the class. In order for daily assessment to be used by all program teachers, a simplified pupil sampling arrangement was developed for the 1969-70 revision.

SUMMATIVE EVALUATION

It is the position of the Southwest Regional Laboratory that comparative experiments, which are the traditional building blocks of summative evaluation, are almost irrelevant to product development. Dr. Schutz asserts that producing the best product on the one hand and making comparative measurement of product effectiveness on the other are diametrically opposed. In comparative experimentation, the emphasis is on cross-sectional rather than sequential activity. Schutz bewails, furthermore, that in comparing two products the total number of identifiable differences between products may be only slightly less than infinite inasmuch as each product represents a huge bundle of hypotheses. Thus, he points out that it is hard to develop a "strong inference" position whereby rival hypotheses can be developed and tested and one can be rejected, leading to further examination of the remaining options.

As spokesman for the Laboratory, Schutz (1971 b) emphasized that it is not especially interesting to discover differences (or, more likely, lack of differences) between an ill-defined version of one program and an ill-defined version of another program in performance on one or two outcome measures.

> Because potentially powerful treatments are currently performing no better than inherently weak ones is analogous to concluding that a missile and a cannon are no different simply because each fails to ready its target on the first shot [37].

It is, therefore, not surprising that SWRL has dedicated very little time and energy to the performance of comparative experiments. However, despite this proclaimed party line position, during the 1969-70 school year the SWRL communication skills program was tried out in Dallas, Texas.

An attempt was made to compare the results of that tryout with the results produced by another kindergarten reading program, namely, the Harper and Row Basal Reading Program. This comparison was made utilizing first grade children in four schools within the Dallas Independent School District. Three first grade teachers at a school which was using the First Year Communication Skills Program each taught two reading classes. Therefore, there were six experimental classes. Three comparison schools were selected because of similar socioeconomic level represented in comparison with the classes using the SWRL program. In general, the comparison attempted to use a program-fair testing procedure in which evaluation items were constructed to measure directly the objectives which were deemed to be congruent between the two programs. Items were also included which were unique to the two individual programs. Comparisons could then be made on the success of the two programs in meeting mutually important objectives, as well as the success of the programs in attaining their own unique objectives.

The end-of-year SWRL test was constructed to assess performance on the three important objectives of the SWRL program: (1) program words, (2) word elements, and (3) word-attack skills; as well as to assess performance on the comprehension objective of the commercially published program. Ten items were constructed assessing performance on each of these four objectives. The test covering the commercially published program was constructed to assess performance on the outcomes of that program as stated in the program's teacher manual. These outcomes were as follows: (1) basic program words; (2) word-

attack in isolation; (3) word-attack in context; and (4) comprehension. Both the SWRL end-of-year test and the test covering the district adopted program were individually administered during the last week of the 1969-70 school year. Ten children were randomly selected from each of three SWRL trial classes to constitute the 30 children in the FYCSP sample. Ten children who had completed the district's reading program primer were randomly selected from each of six classes in the three comparison schools and were administered the program-referenced test covering the district program. Thus, the test over the district program was administered to a total of 60 children.

The results from the FYCSP sample demonstrated a mean score of 87% for the 30 items assessing the three SWRL outcomes. The mean score from the comparison sample for the items covering the outcomes of the district adopted text was 58% for 40 items. Certain outcomes of the two programs were similar so that performance comparisons could be made between the two programs on items related to these outcomes. On the objective of recognizing basic program words, children in the FYCSP responded correctly to 96% of the items, whereas the comparable score for the children who went through the district basal reading program was 89%. In the area of word-attack skills in the SWRL program, 75% of the children responded correctly, whereas in the district program only 31% responded correctly to the word-attack in isolation and 44% to the word-attack in context items. The comprehension items produced a result of 63% for the FYCSP, as opposed to 65% for the district basal reader. Comparison was an outcome which was a specified objective of the district program. As was noted above, it was included on the SWRL test to provide additional comparative data. Since the program-fair tests were based on both common and unique program content, they were felt to be more representative for the comparative evaluation of program effectiveness than either a standardized test or a test based exclusively on common content.

Thus, children in the SWRL program recognized a slightly higher percentage of program words, performed work-attack skills much better, and achieved at a slightly lower level on reading comprehension than did the comparison children.

DIFFUSION

Agency Participation

At present no other agencies are involved in the diffusion or, as the Laboratory refers to it, the marketing of the First Year Communication Skills Program. Ginn and Company will receive exclusive licensing right to publish and distribute the entire Kindergarten Communication Skills Program, which includes an Instructional Concepts Program related to reading readiness and the FYCSP, along with the associated support programs.

Diffusion Strategy

The Laboratory asserts that there has not been an identifiable "diffusion strategy" for the First Year Communication Skills Program. SWRL explicitly avoids use of the terms "diffusion" and "dissemination," and speaks rather about distribution and marketing of developed products. From the beginning, SWRL was under the assumption that the distribution and marketing of the products that they developed would be handled by the private sector. This remains the conception of the Laboratory and has led to the competitive selection of a commercial distributor for the Kindergarten Communication Skills Program. However, it is interesting to note that the 1971-72 large-scale utilization of the FYCSP has been brought about without the efforts of a commercial distributor, but rather, under the auspices of the Laboratory's non-exclusive licensing agreement. During 1970-71 33,000 pupils used, and in 1971-72 approximately 100,000 pupils will be utilizing the program under agreements of this type. The 33,000 children were located in 12 states: Arizona, California, Colorado, Illinois, Indiana, Kentucky, Michigan, Minnesota, Missouri, Nevada, Tennessee, and Texas.

Non-exclusive licensing was developed as a result of contacts with legal counsel and a desire to allow schools that participated in the development tryouts of the program to actually use the finished product. Although there was no conscious effort to develop a diffusion of information about the program, the Laboratory claims that the good relationships that the Laboratory engendered during the field tryout phase, along with reported success of the program in achieving its outcomes, has been the main factor contributing to the constant stream of school administrators requesting the opportunity to utilize

the First Year Communication Skills Program. It is worth noting that in the early field trial cycles (1966-67, 1967-68) referenced previously, SWRL provided the program materials at no cost to the participating school districts.

Dr. Schutz proclaims there is little practical utility in identifying an implementation strategy based on alleged sociological diffusion theory, and furthermore, the use of the word "theory" in connection with the word "diffusion" degrades the concept of theory.

Installation Procedures

Installation procedures are included within the general scope of the Laboratory's installation systems development. In general, this involves the identification of characteristics and requirements for the successful implementation of the Laboratory programs, such as the FYCSP (see the previous section regarding the 1968-69 tryout). SWRL has done some work regarding installation after the program becomes commercially available, but the Laboratory feels it will be difficult to sell the marketing agency on the necessity of identifying and maintaining an installation strategy. Historically, this is not done in educational marketing endeavors.

ADOPTION

The First Year Communication Skills Program has not been available for a long enough time to have an identified pool of adoptors. About 33,000 users in 12 states are utilizing the program in 1971-72 on a non-exclusive licensing basis.

FUTURE OF THE PRODUCT

The Laboratory views the First Year Communication Skills Program as the leader of a phalanx of products which will be emerging from its R & D process. The Laboratory has recently been informed that the Secretary of Health, Education, and Welfare and the Commissioner of Education have agreed on an incentive support program that will make it possible for 10% of the kindergarten classes in the country to install the SWRL kindergarten program in fall 1972.

Although the products of the Laboratory have received a large part of the visibility, also coming out of SWRL has been a development technology which may enable product development to be carried out with more expertise in the future. The staff feel that in five years the First Year Communication Skills Program will be obsolete in the sense that it will be superseded by other more efficient SWRL products. One of SWRL's major objectives is to cut the turn-around time that now exists between the research base and the widespread adoption of more effective educational techniques and processes.

CRITICAL DECISIONS

The following events are a good approximation of crucial decisions which were made in the five year developmental history of the Southwest Regional Laboratory's First Year Communication Skills Program. Although an attempt has been made to maintain chronological order in stating these events, it must be realized that such decisions are not usually made at one point in time, nor in strictly sequential order.

Decision 1: To Select the Area of Greatest Laboratory Emphasis

The following alternatives were considered in defining the area of primary Laboratory emphasis: (1) applied research and development leading to the generation of new products and procedures; (2) installation and field testing of pre-existing products and procedures; and (3) basic experimental research.

Alternative (1) was selected. The personnel who originated the Southwest Regional Laboratory had unique background and qualifications in the area of educational product development. Their experience in the Classroom Learning Laboratory at Arizona State University had resulted in a facility for the development of programmed instructional procedures which could reliably produce intended learning outcomes. It should also be noted that field testing of pre-existing products and basic experimental research were also possible, indeed, often required, under the major emphasis on product generation.

The consequences of this decision have manifested themselves in the entire Laboratory program. Major staff members have generally represented the philosophical position of empiricism; objectives-based instruction, programmed instruction, criterion-referenced measurement, formative evaluation, etc.,

have been stressed. The number of possible development efforts which could be undertaken by SWRL has been limited by this choice of alternatives, in that the development of new research-based products requires more time and more funding than the installation and field testing of already developed products and procedures.

Decision 2: To Focus on Existing Objectives

The following alternatives were open: (1) develop products and procedures based on existing, generally accepted objectives; and (2) drastically revise or develop new objectives.

Products based on existing objectives would tend to stress traditional subject matter disciplines, while new objectives could be constructed in such areas as facilitating inquiry, developing achievement motivation, process skills, etc. It was decided that the greatest payoff in terms of educational improvement would be based on utilizing existing objectives. Again, the strong and selective background of the founders of the Laboratory in programmed instruction determined this decision. One of their beliefs is that methods do exist and can be applied to improve student attainment of existing instructional objectives, if the objectives can be operationally defined and arranged in an appropriate sequence. As a consequence, the products of the Laboratory to date have not been of a "revolutionary" nature. They have been directed toward fairly common and well recognized educational problems and objectives. The stress on pre-existing objectives helped to insure a ready audience for the products that would emerge from SWRL's development cycle.

Decision 3: To Select a Five-Year Development Cycle

The following alternatives were perceived to be open in producing products and procedures which would have impact on the target populations which were to be identified: (1) one year; (2) two to three years; (3) four to seven years; and (4) eight to fifteen years. Funding provided by the regional laboratory program has allowed the products of the Laboratory to be designed on a five-year cycle, although it is hoped that the time of the cycle can be reduced due to the evolution of a more sophisticated product development technology. This means that, although the Laboratory has been in existence for five years, the First Year Communication Skills Program is just beginning to have an impact on education. In light of the extensive development, formative evaluation, and

installation work that has been done on this product, it seems that this was a reasonable choice of time to arrive at a functional product. From this perspective, it is interesting to note the obstinacy of the SWRL staff in resisting pressures to "turn out" a product prior to testing it, revising it, and attempting to validate it through the performance of thousands of students in large-scale field tryouts. Another staff might have done a less unyielding job of resisting pressures to "produce," to the possible detriment of the resulting product's effectiveness.

Decision 4: To Select an Urban Target Population

The alternatives open consisted of urban or rural. Since it was well recognized by the staff of the Southwest Regional Laboratory that most educational failures and the biggest educational problems were occurring in the urban areas, it was decided that the basic type of community as a target population for the development of educational products and procedures would be urban. It was felt that should these procedures prove functional in improving the performance of students in the urban community, the procedures could be adapted to the rural community more easily than the reverse direction. The potential payoff in terms of large-scale use and wide visibility was also much greater.

Decision 5: To Focus on Preschool and Elementary Levels

The alternatives open were preschool, elementary, secondary, and college. Since it was felt that very little can be done in the way of education without the development of a sound foundation, the primary emphasis for the Laboratory was decided to be preschool and elementary education. Within preschool and elementary, the kindergarten and lower primary grade levels were selected as having the most potential for the development of a useful foundation in the basic skills areas.

Decision 6: To Target Toward a Range of Aptitude Levels

The range of target options included a full normal range of apptitudes, a low or educationally handicapped population, or a high educationally able population. It was determined that the product and processes to be developed would attempt to cover the entire population of individuals who had not yet achieved the objectives of the product. This meant that the entire aptitude range was considered in developing the materials of the FYCSP. As a

consequence of this decision, the widest possible range of socioeconomic status could be included in the target population. In addition, it implied that the product had to be individualized in such a manner that students of all abilities could be allowed to function at a level appropriate to their needs.

Decision 7: To Develop a Program Aimed Directly at the Student

The alternatives open under this decision included the development of products and procedures which relate directly to the education of children as opposed to the development of products and procedures which may be categorized as teacher education. In other words, a decision had to be made whether to develop products and procedures with which children would have direct contact, or to develop products and procedures which would increase the the teaching competencies of teachers in a given area.

It was decided to take the former course, stressing materials which would have a direct and observable impact on children. SWRL felt that teacher education could be built in as a result of this choice by developing instructional products and procedures to assist teachers in utilizing the student materials. The Laboratory believed that this was a relatively fail-safe method for producing a teacher-proof product to influence the behaviors of the target population of preschool and lower primary children.

Decision 8: To Develop Subject Matter Oriented Learning Tasks

The alternatives open under this decision were the development of subject matter oriented learning tasks, as opposed to the development of generalized problem solving and information processing skills or achievement motivation. The first alternative would stress the development of competencies, such as knowledge, abilities, and specific skills within subject matter areas such as language arts, mathematics, etc. The latter option would have developed generalizable skills or higher motivation levels which could be applied to any subject matter area.

While the subject matter orientation was selected, it was decided that the two options were not antithetical to one another. It was presumed possible to develop various strategies for increasing the problem solving skills and achievement motivation of students within a subject matter area framework. This decision also insured applicability with a greater number of schools,

since it was felt that almost all schools are desirous of improved instruction in basic reading and computational skills at the primary level.

Decision 9: To Use a Relatively Conventional and Inexpensive Format

The following options were considered: (1) the development of instructional materials such as texts, structured exercises, etc.; (2) the development of materials for use with instructional media such as television, computer-assisted instruction, films, etc.; (3) development of simulation and gaming techniques; and (4) development of processes emphasizing the employment of teacher aides and paraprofessionals. One of the constraints explicitly imposed on the product was that materials and procedures selected would be implementable within the economic and structural constraints of virtually all classrooms of the urban preschool and primary grade target population identified. This dictated the selection of the first option, with the inclusion of the other options where feasible.

Decision 10: To Focus on Communication Skills

The range of alternatives included all of the traditional subject matter areas such as language arts, mathematics, social studies, and science. It was determined that the greatest need existed in the area of communication skills, and specifically the development of English language competencies and reading skills. Reading was commonly agreed on as an area in which major deficits existed in the identified target population. Further, it was a foundation upon which all other subject matter areas depend. In reality, reading was the only option which was seriously considered in this decision area.

Decision 11: To Use Primarily R & D Staff

It was possible to stress the expertise of either or both of two different types of personnel in the development of the preschool communication skills product. The first was the subject matter expert, such as the linguist, reading specialist, learning psychologist, etc.; the second was the classroom teacher. As was previously mentioned, the product was to be designed such that it was, as nearly as possible, teacher proof and fail-safe. Thus, although classroom teachers participated in the development to the extent of offering practical evidence of areas which would require further refinement regarding

teacher activities and acceptance, it is apparent that the psychologists and researchers of the SWRL staff played the major role in developing FYCSP.

Decision 12: To Emphasize Formative Evaluation

The alternatives open under this decision include: (1) the continuous formative evaluation and revision of the product; as opposed to (2) the development of the product in-house with a final comparative-type summative evaluation. As is apparent from the major event flow chart on pages 24 - 25, the strategy of developing, revising, and further developing, which has been called formative evaluation, was the option selected. Five development, evaluation, and revision cycles are identified in the development cycle of the First Year Communication Skills Program.

Decision 13: To Select a Commercial Publisher

The options for marketing involved the selection of either a public or a private sector distributor for the First Year Communication Skills Program. It was determined that an agency in the form of a commercial publishing firm would be selected to market the FYCSP.

This decision probably reflects the single-mindedness of purpose which is exemplified by the Laboratory staff. Distribution would have been beyond their area of expertise and would have spread the available personnel too thin.

A likely consequence of this decision is the somewhat selective current distribution of the program under the Laboratory's non-exclusive licensing program. Most current user districts are those which actively solicited SWRL to be allowed to use the program. This implies that "natural selection" of the volunteer and probably progressive districts has produced the current user pool.

REFERENCES

Coleman, E. B. Collecting a data base for an educational technology. Journal of Educational Psychology Monograph, 1970, 61 (4) part 2, 1-23. (a)

Coleman, E. B. Developing a technology of written instruction: Some determiners of the complexity of prose. In E. Rothkopf (Ed.), Symposium on verbal learning research and the technology of written instruction. New York: Teachers' College, Columbia University, 1970. (b)

Schutz, R. E. The nature of educational development. Journal of Research and Development in Education, 1970, 3 (3), 39-64. (a)

Schutz, R. E. Programmatic instructional development. Professional paper 11. September 11, 1970. (b)

Schutz, R. E. Schutz presentation at publishers' briefing on kindergarten program request for proposal. February 23 and March 2, 1971. (a)

Schutz, R. E. SWRL Program Plan, 1971 (Draft). April 15, 1971. (b)

Sullivan, H. J. Variables affecting the success of a beginning reading program. Paper presented at the annual meeting of the American Educational Research Association, Chicago, February, 1968.

APPENDIX A

ILLUSTRATIVE RULES FOR DEVELOPING INSTRUCTIONAL PRODUCTS

Instructional Specifications

IS:1. All instructional objectives must be stated in terms of learner post-instruction behavior.

IS:2. Enroute and entry behaviors should also be behaviorally described in the instructional specifications.

IS:3. If the learner's response is constructed (as opposed to selected), the criteria must be specified for judging the adequacy of his response.

IS:4. There should be some clearly specified method of determining learner effect toward the completed instructional product.

Item Tryout

IT:1. The criterion test must be completely developed prior to the development of the instructional product.

IT:2. Measures of the entry and enroute behaviors should also be constructed during the item tryout stage.

IT:3. Prototype items should not deviate from the behaviors described by the instructional specifications.

IT:4. Prototype items should be tried out first with a small number of learners, later increasing the number of such learners.

Product Development

PD:1. Supply the learner with appropriate practice during the instructional sequence.

PD:2. The product should provide the learner with the opportunity to obtain knowledge of results.

PD:3. Attempt to promote the learner's interest in the instructional product.

PD:4. Avoid the development of an inflexible strategy in approaching product development tasks.

PD:5. If teachers are involved in the instructional process, make their participation as replicable as possible.

PD:6. In general, adopt a "lean" programming strategy.

PD:7. If the product is to be used in the classroom, develop it so that teacher attitudes toward the product will be positive.

PD:8. The selection of the instructional medium should be made in light of the desired instructional objectives, intended target population, cost, etc.

PD:9. The time devoted to the development of the product should be commensurate with the importance of that product.

APPENDIX B

TRAINER'S GUIDE
FIRST YEAR COMMUNICATION SKILLS PROGRAM

EQUIPMENT CHECKLIST

- ☐ a. Filmstrip Projector (with extra bulb)
- ☐ b. Cassette Tape Recorder
- ☐ c. 16mm Sound Projector (with extra bulb)
- ☐ d. Screen
- ☐ e. Extension Cord

If you are unfamiliar with the operation of the equipment, arrange for someone to assist you with it during training.

MATERIALS CHECKLIST

- ☐ a. SWRL 16mm film, the First Year Communication Skills Program: A Foundation for Success in Reading
- b. SWRL filmstrip for:
  - ☐ Word Attack
  - ☐ General Instructional Procedures
  - ☐ Assessment and Review
- c. SWRL audio-tape for:
  - ☐ Manual and Materials Overview
  - ☐ Word Attack
  - ☐ General Instructional Procedures
  - ☐ Assessment and Review
- d. SWRL script for:
  - ☐ Word Attack
  - ☐ General Instructional Procedures
  - ☐ Assessment and Review
- ☐ e. Teacher Training Kits (one per teacher)
  1. Teacher's Manual
  2. Index Card
  3. Flashcards
  4. Activity and Materials Guide
  5. Procedure Card
  6. Oral Word Index Card
  7. Animal Card

8. Criterion Exercise Training Direction Card
9. Criterion Exercise Directions Card
10. Criterion Exercise
11. Practice Exercise
12. Storybook
13. Entry Skills Test
14. Entry Skills Test Record Form
15. General Instructional Procedures Workbook

☐ f. Pencils (one per teacher)

EQUIPMENT PREPARATION

☐ Set up equipment and verify its working order.

☐ Organize materials for distribution.

☐ Thread 16mm film, First Year Communication Skills Program: A Foundation for Success in Reading, into projector.

☐ Insert Manual and Materials Overview tape cassette into recorder.

☐ Check that tape is set to play at the beginning.

☐ Thread filmstrip, Word Attack Skills, and place script beside projector.

☐ Turn to first visual and adjust focus.

CONDUCTING THE TRAINING SESSION

Introduction

- Begin the training session with welcoming remarks.
- Introduce guests and, if appropriate, the school official who will indicate district support and interest in the Program.
- Introduce along the following lines:

> "Today's session will acquaint you with the organization, content, and procedures of the First Year Communication Skills Program. You will become familiar with the development of the Program, the instructional procedures required to use the Program appropriately, and the agency that produced it, the Southwest Regional Laboratory, called SWRL.
>
> "The First Year Communication Skills Program is designed to help young children learn basic skills of English language communication. It requires that teachers perform some new instructional tasks. The Program should contribute to a challenging and fulfilling year."

Film: The First Year Communication Skills Program: A Foundation for Success in Reading

Equipment: 16mm Sound Projector
Screen

Time: 15 minutes

- Introduce along the following lines:

  "The film, First Year Communication Skills Program: A Foundation for Success in Reading, provides a program overview. It describes the Program rationale and objectives and the materials and procedures used to accomplish the objectives."

- Show film.

Audio-tape: Manual and Materials Overview

Equipment: Cassette Tape Recorder

Time: 10 minutes

- Ready tape recorder.
- Distribute teacher training kits.
- Introduce along the following lines:

  "You have received a training kit intended to familiarize you with the contents of the Teacher's Manual and the Program materials you will use in instruction. The recorded narration will guide you through the Manual and materials at a rather rapid pace, touching on major topics. Please note the last item in the package is titled 'General Instructional Procedures.' You will be using it later in the session.

  "This is your set of materials. You will be using them during the training program. They represent your primary resource for the instructional program."

- Start tape.

Filmstrip and tape: Word Attack Skills

Equipment: Cassette Tape Recorder
Filmstrip Projector
Screen

Time: 15 minutes

- Replace Manual and Materials Overview cassette tape and filmstrip with Word Attack Skills.

- Introduce along the following lines:

  "This sequence presents models for pronouncing word elements and sounding out words.

  "After the presentation you should be able to:

  1. pronounce with uniformity word elements taught in the Program, and

  2. properly sound out any Program word."

- Start filmstrip and tape.

  When each tone sounds, turn the filmstrip to the next frame. Refer to the script occasionally to confirm that the replica of the filmstrip pictured on the script is the one being viewed at that time. If the narration and visual do not correspond, you may synchronize them in the following manner:

  1. Allow the narrative to play to the end of the frame, noting the last few sentences.

  2. Stop the tape recorder when the tone sounds.

  3. Check the script to determine which frame ends with those last few sentences. (It should be within four frames of the number of the visual on the screen.)

  4. After locating the frame in which the narrative you heard appears, turn the filmstrip to the visual which is pictured on the script.

  5. Advance the visual to the NEXT frame. (Since the tone has sounded, the narrative for this frame should be ready to play.)

  6. Start the tape recorder and refer to the script to verify that the narrative and visual correspond.

Filmstrip, tape, and exercises: General Instructional Procedures

Equipment: Cassette Tape Recorder
Filmstrip Projector
Screen

Time: 25 minutes

- Replace Word Attack Skills cassette tape and filmstrip with General Instructional Procedures.

- Distribute pencils.

- Have teachers place the General Instructional Procedures Workbook in front of them.

- Introduce along the following lines:

  "Educational research studies and previous tryouts have led to the development of certain general instructional procedures for maximizing children's learning. The procedures relate to providing appropriate, individual, and abundant practice, and handling correct and incorrect responses.

  "For this presentation, you have been provided a short series of exercises. Several times during the filmstrip sequence you will be directed to these exercises."

- Start filmstrip and tape. When you reach the visual "Use Your Workbook," the screen will be blank; at this point, turn off the recorder and projector. Restart them when the teachers are ready.

Filmstrip and tape: Assessment and Review

Equipment: Cassette Tape Recorder
Filmstrip Projector
Screen

Time: 10 minutes

- Replace General Instructional Procedures cassette tape and filmstrip with Assessment and Review.

- Introduce along the following lines:

  "This filmstrip describes the procedures to be followed after you have completed a unit of instruction. These procedures include administering Criterion Exercises and conducting review lessons for those children who need additional practice."

- Start filmstrip and tape.

- Specify arrangements unique to your district, e.g., resource personnel and material distribution.

APPENDIX C

CONSULTANTS WHO REVIEWED COMMUNICATION SKILLS PROJECT PLANS

April-May, 1966

Arthur Bachrach, Arizona State University

John Bormuth, University of Minnesota

Linda Braun, Tufts University

Robert Dykstra, University of Minnesota

Richard Hodges, University of Chicago

Harlan Lane, University of Michigan

Walter MacGinitie, Teachers College, Columbia

Richard Madden, San Diego State College

Sigmar Muehl, University of Iowa

David Reed, University of California, Berkeley

Harry Singer, University of California, Riverside

Sue Ervin Tripp, University of California, Berkeley

APPENDIX D

THE PRODUCT DEVELOPMENT CYCLE

Development Stage	Review Base	Review Criteria	Review Outcomes
1. Formulation	a. Technical plan including: a description of components in terms of pedagogical, environmental, management, and time characteristics b. List of prerequisite skills and desired instructional outcomes, including criterion tests, or prototype item for each c. Unique development considerations d. Event schedules and personnel requirements	a. Anticipated utility b. Anticipated cost c. Feasibility of schedule d. Accessibility of required personnel	a. Go or no go decision b. Recommended modifications of proposed objectives, content, procedures, etc. (if decision is "go") c. Statement of next steps in development (e.g., revise plan and resubmit, hire specified personnel types, etc.)
2. Component Development	a. Specifications for each component in terms of pedagogical, environmental, management, and time characteristics b. Report summarizing prototype tryout of each component c. At least two sample lessons associated with each component	a. Completeness of specifications b. Consistency with formulation requirements c. Feasibility of components d. Completeness and quality of component testing e. Technical quality of prototype lessons	a. Recommended changes in components, prototype lessons, or further testing b. Statement of next steps in development
3. Product Preparation	a. All materials for program b. Field tryout prospectus	a. Instructional and technical quality of product b. Consistency with instructional specifications and prototype components c. Adequacy of supplementary materials (including teachers' manual) d. Appropriateness of proposed tryout procedures	a. Recommended changes to be made in product or tryout procedures b. Statement of next steps in development
4. Product Tryout	a. Report summarizing tryout and presenting all evaluation data and proposed revisions in product	a. Validity of effect as indicated by learner performance b. Learnability as indicated by performance data and observer report c. Instructional time and cost	a. Recommended revisions in methods or materials b. Revisit to preceding phase c. Prepare for installation
5. Development Analysis	a. Written summary and evaluation of the entire development cycle with the particular product	a. Instructional and technical quality of materials b. Consistency with recommended revisions c. Efficiency of procedures used in product development cycle	a. Recommended changes in revision and tryout procedures (if any) b. Statement of next steps in development (if any) c. Statement of changes to be incorporated in SWRL product development procedures

APPENDIX E

SWRL Instructional Product Development Stages

Stage	Activity	Uncertainty Focus	Typical Duration of Tryout
Formulation	Specifying the desired instructional outcomes; identifying the skills required to achieve the outcomes; designing strategies for teaching the skills.	Specification parameters.	One to several experimental sessions.
Prototype	Testing instructional strategies by empirically investigating variations of materials and methods, and assessing the impact of each variation.	Product specifications.	One day to few weeks.
Component	Producing a segment of instruction and trying it out with a single learner or groups of learners in a natural setting to determine if the instruction accomplishes its objectives.	Instruction parameters.	One week to few months.
Product	Successively trying out and revising a Combination of components in a natural setting until acceptable levels of performance have been attained.	Instructional effectiveness.	One to several "semester" units.
Installation	Integrating a product into programs which are combined with existing school instruction to determine procedures for widespread implementation.	User training.	One to several "semester" units.
Program	Involving those agencies which will be responsible for maintaining operational use of a program without the direct assistance of the development agency.	Program management.	One to several years.

APPENDIX F

LIST OF PRODUCTS AND DEVELOPERS

1. Arithmetic Proficiency Training Program (APTP)
   Developer: Science Research Associates

2. CLG Drug Education Program
   Developer: Creative Learning Group
   Cambridge, Massachusetts

3. Cluster Concept Program
   Developer: Dr. Donald Maley and Dr. Walter Mietus
   University of Maryland

4. Developmental Economic Education Program (DEEP)
   Developer: Joint Council on Economic Education

5. DISTAR
   Developer: Siegfried Engelmann & Associates

6. Facilitating Inquiry in the Classroom
   Developer: Northwest Regional Educational
   Laboratory

7. First Year Communication Skills Program
   Developer: Southwest Regional Laboratory for
   Educational Research & Development

8. Frostig Perceptual-Motor Skills Program
   Developer: Dr. Marianne Frostig

9. Hawaii English Program
   Developer: Hawaii State Department of Education
   and the University of Hawaii

10. Holt Social Studies Curriculum
    Developer: Dr. Edwin Fenton
    Carnegie Education Center
    Carnegie-Mellon University

11. Individually Prescribed Instruction--Math
    Developer: Learning Research and Development Center,
    University of Pittsburgh

12. Intermediate Science Curriculum Study
    Developer: Florida State University
    Dr. Ernest Burkman

13. MATCH--Materials and Activities for Teachers and Children
    Developer: The Children's Museum
    Boston, Massachusetts

14. Project PLAN
    Developer: Dr. John C. Flanagan and
    American Institutes for Research

15. Science: A Process Approach
    Developer: American Association for the Advancement
    of Science, Commission on Science Education

16. Science Curriculum Improvement Study
    Developer: Dr. Robert Karplus, Director
    University of California, Berkeley

17. Sesame Street
    Developer: Children's Television Workshop

18. Sullivan Reading Program
    Developer: Dr. M. L. Sullivan

19. Taba Curriculum Development Project
    Developer: San Francisco State College

20. Talking Typewriter
    Developer: Omar K. Moore and Responsive Environments
    Corporation

21. Variable Modular Scheduling
    Developer: Stanford University and Educational
    Coordinates